

## 40V P-Channel Enhancement Mode MOSFET

### Description

The NP8P04SR uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in load switch and battery protection applications.

### General Features

- ◆  $V_{DS} = -40V$ ,  $I_D = -8A$   
 $R_{DS(ON)}(Typ.) = 37m\Omega$  @  $V_{GS} = -4.5V$   
 $R_{DS(ON)}(Typ.) = 27m\Omega$  @  $V_{GS} = -10V$
- ◆ High power and current handing capability
- ◆ Lead free product is acquired
- ◆ Surface mount package

### Application

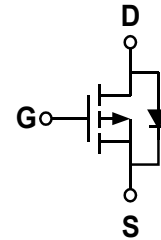
- ◆ Battery protection
- ◆ Load switch

### Package

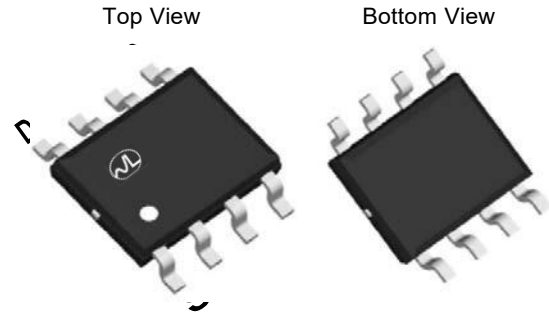
- ◆ SOP-8

*100% UIS TESTED!*  
*100%  $\Delta V_{ds}$  TESTED!*

### Schematic diagram



### Marking and pin assignment



XXXX—Wafer Lot No. YYYY—  
 Quality Code



### Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
PECN8P04S R-G	-55°C to +150°C	SOP-8	4000

### Absolute Maximum Ratings (TA=25°C unless otherwise noted)

parameter	symbol	limit	unit
Drain-source voltage	$V_{DS}$	-40	V
Gate-source voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	TC=25°C	-8
		TC=70°C	-6
Pulsed Drain Current	$I_{DP}$	-32	A
Avalanche energy( L=0.1mH)	$E_{AS}$	24	mJ
Power Dissipation	$P_D$	TC=25°C	3
		TC=70°C	2.1
Operating junction Temperature range	$T_j$	-55—150	°C

## Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF Characteristics</b>						
Drain-source breakdown voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-40	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=-40V, V_{GS}=0V$	-	-	-1	$\mu A$
Gate-body leakage	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	$\pm 100$	nA
<b>ON Characteristics</b>						
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	-1.4	-2.0	V
Drain-source on-state resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=-8A$	-	27	32	m $\Omega$
		$V_{GS}=4.5V, I_D=-6A$	-	37	45	
Forward transconductance	gfs	$V_{DS}=-5V, I_D=-8A$	-	17	-	S
<b>Dynamic Characteristics</b>						
Input capacitance	$C_{ISS}$	$V_{DS}=-20V, V_{GS}=0V$ $f=1.0MHz$	-	964	-	pF
Output capacitance	$C_{OSS}$		-	109	-	
Reverse transfer capacitance	$C_{RSS}$		-	96	-	
<b>Switching Characteristics</b>						
Turn-on delay time	$t_{D(ON)}$	$V_{DS}=-20V$ $R_L=2.2 \Omega$ $V_{GS}=-10V$ $R_{GEN}=10 \Omega$	-	5.5	-	ns
Rise time	tr		-	14	-	
Turn-off delay time	$t_{D(OFF)}$		-	24	-	
Fall time	tf		-	12	-	
Total gate charge	Qg(10V)	$V_{DS}=-20V, I_D=-8A$ $V_{GS}=-10V$	-	22.9	-	nC
Total gate charge	Qg(4.5V)		-	24	-	
Gate-source charge	Qgs		-	3.5	-	
Gate-drain charge	Qgd		-	5.3	-	
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>						
Diode forward voltage	$V_{SD}$	$V_{GS}=0V, I_S=-1.0A$	-	-0.8	-1.0	V

## Thermal Characteristics

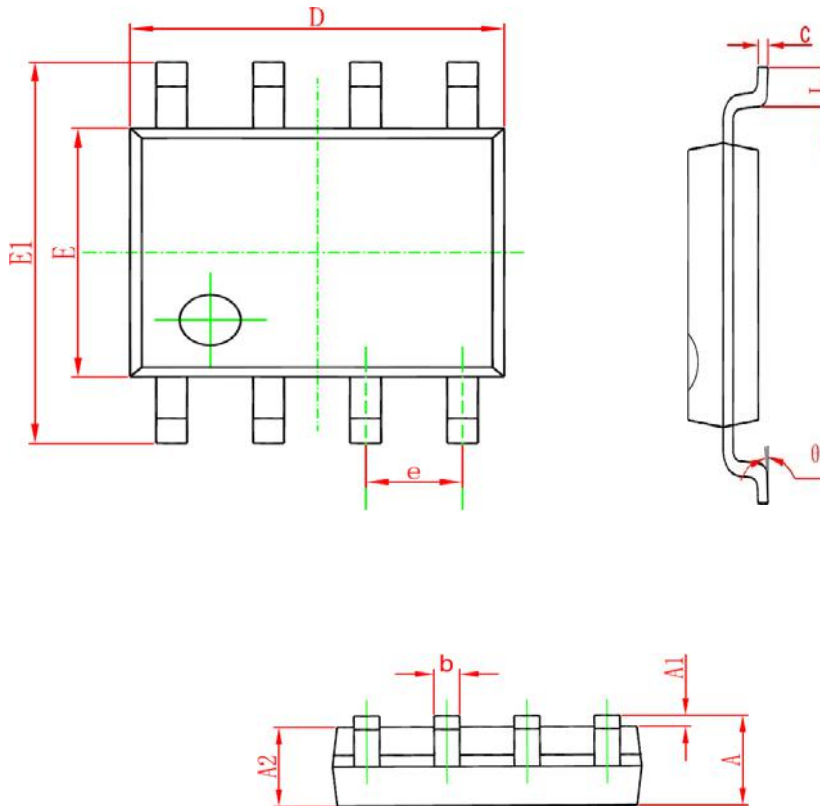
Parameter	Symbol	Typ	Max	Unit
Maximum Junction-to-Ambient <sup>A</sup>	$\leq 10s$	33	40	°C/W
Maximum Junction-to-Ambient <sup>A</sup>	Steady-State			
Maximum Junction-to-Lead <sup>B</sup>	Steady-State	16	24	

A: The value of  $R_{qJA}$  is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ C$ . The value in any given application depends on the user's specific board design. The current rating is based on the  $t \leq 10s$  thermal resistance rating.

B: The  $R_{qJA}$  is the sum of the thermal impedance from junction to lead  $R_{qJL}$  and lead to ambient.

## Package Information

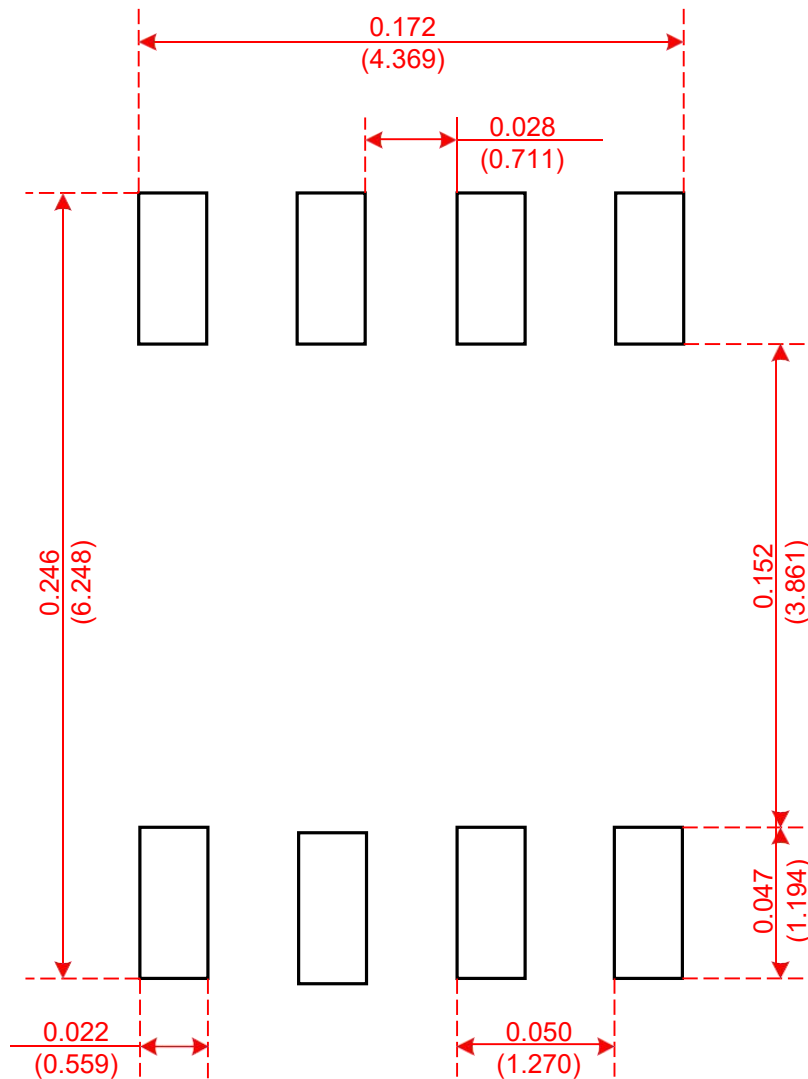
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Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

## Recommended Minimum Pads

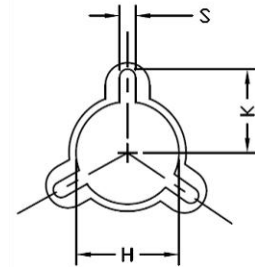
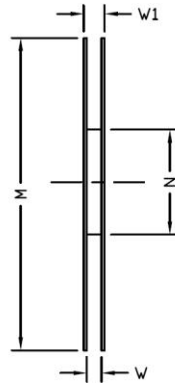
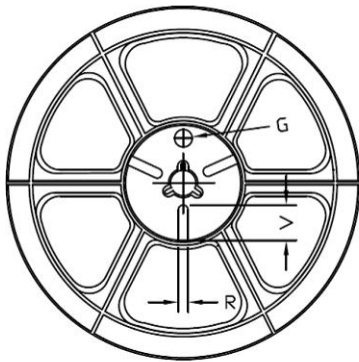
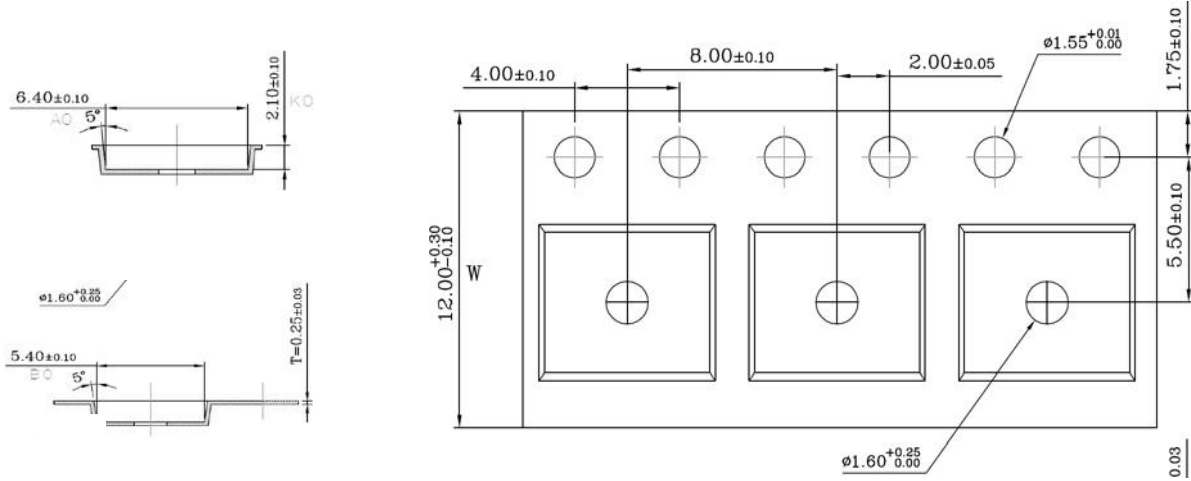
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Recommended Minimum Pads  
Dimensions in Inches/(mm)

## Tape and Reel

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Tape Size	Reel Size	M	N	W	W1	H	K	S	G	R	V
12mm	Φ330	Φ330.00 ±0.50	Φ97.00 ±0.30	13.00 ±0.30	17.40 ±1.00	Φ13.00 ±0.5	10.6	2.00 ±0.50	—	—	—

Unit Per Reel:  
4000pcs

